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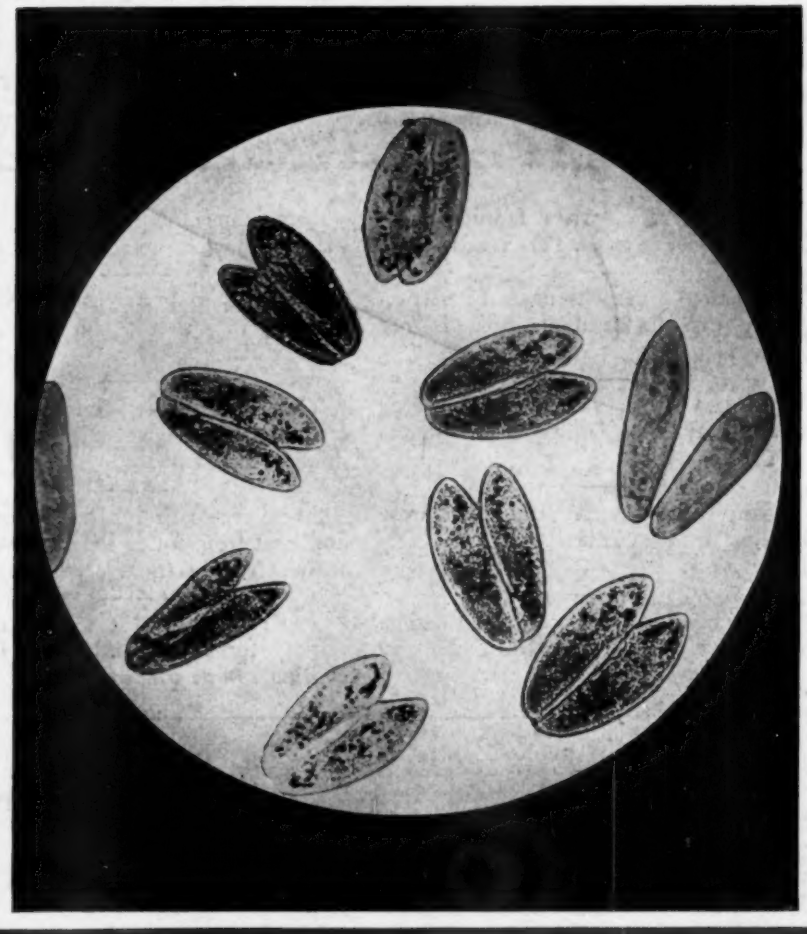
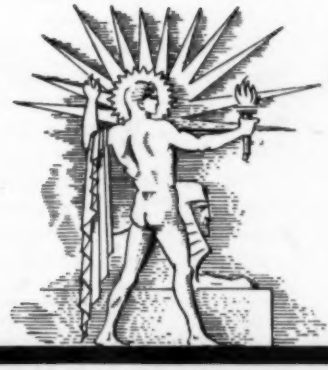
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •





March 18, 1939

Paired Paramecia

See Page 166

A SCIENCE SERVICE PUBLICATION

Do You Know?

The Ukraine contains one-fifth of the Soviet Union's population.

Friction of steel on a synthetic ruby is only half as much as on a natural ruby.

In extending its farm-to-market road system, Missouri plans to use soap, salt, lime, and agricultural waste such as cornstalks.

At birth, a colt is roughly three-fifths of its mature height, and at nine months of age it is about half as heavy as it will be when grown.

In the interests of public health, more than 5,000 persons employed at the New York World's Fair are being vaccinated against smallpox.

A three-year study of two "guinea pig" lakes has been made in Wisconsin to see how well fishing and conservation get along together.

The mummy of an Egyptian will be exhibited at the New York World's Fair to show how the fluoroscope reveals the interior of a human body.

Prehistoric salt mines are being dissolved, as canyon walls of the Colorado and Virgin Rivers are submerged by Boulder Dam's great lake.

The female vaporer moth gives off a scent so delicate that human beings cannot smell it, yet male moths a mile away can detect it with their antennae.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

ARCHAEOLOGY

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PSYCHOLOGY

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PUBLIC HEALTH

What sort of dust can miners inhale to cure them of the effects of breathing silica dust? p. 163.

What is the explanation of the Biblical "three-day-darkness"? p. 174.

Soil conservation was a familiar problem in ancient China, Persia and India.

Mammoth Cave has never been completely explored and its area is not known.

Thirteen new marine radiobeacons were installed in United States waters in 1938.

Many valuable varieties of wheat were brought to the United States by early immigrants.

The only adult rhinoceros captured in Africa has proved very tractable, and enjoys being petted.

Complaints of population congestion in Manhattan were heard as early as 1801.

Grasshoppers prefer corn to sorghum, but why they should is a puzzle to entomologists.

The United States and Great Britain control about three-fourths of the world's mineral industries.

Sweet cream, if salted, can be stored and kept fresh for as long as two weeks without refrigeration.

The revolving stage will be the next novelty for store window displays, according to one prediction.

SCIENCE NEWS LETTER

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PUBLIC HEALTH

Aluminum Dust Inhalations Preventive of Silicosis

Powder Forms a Colloid in Body Fluids Which Seals The Surfaces of Quartz Particles to Prevent Solution

POSSIBILITY that aluminum dust inhalations may serve both as preventive and remedy in silicosis appears in the report of J. J. Denny, metallurgical engineer, Dr. W. D. Robson, chief surgeon of the McIntyre Porcupine Mine, Schumacher, Ont., and Dr. D. A. Irwin, of the University of Toronto. (*Canadian Medical Association Journal,* March)

Silicosis is the lung disease resulting from inhalation of silica or quartz dust. The silicosis-preventive action of aluminum dust inhalations was first suggested in research on rabbits reported by the Canadian investigators to the Academy of Medicine, Toronto, two years ago. In this latest report the scientists further substantiate their findings of two years ago, explain the manner in which aluminum powder prevents quartz dust from damaging the lungs, and show that some quartz dust already inhaled may be gradually removed from the lungs under treatment with aluminum powder.

Prevents Poisoning

The development of the fibrosis of the tissues in the lungs, which is characteristic of silicosis and is produced by the inhalation of extremely fine quartz dust, is known to be due to the poisoning of the phagocytic (scavenger) tissue cells by the silica dust which they engulf. Because they are poisoned and killed, they are unable to eliminate this dust through the usual channels by which inert dusts are eliminated. The present experiments show that the action of the aluminum is to prevent the silica from poisoning and killing the lung phagocytes, and thus allow them to carry away the silica just as they would an inert dust.

It seems that the fine aluminum powder is gradually dissolved by the body fluids in the form of a colloidal or jelly-like aluminum hydroxide, which is then adsorbed and firmly held upon the surfaces of the quartz particles, and seals these surfaces so firmly that the quartz can no longer go into solution and poison the body tissues. Since the aluminum and its hydroxide are themselves harmless and non-irritating, the result is that the quartz particles are also rendered harmless, and therefore placed in the way of being eliminated by natural processes.

The presence of this thin layer of material on the surface of the quartz was demonstrated by the Canadian investigators by staining it with dye, and then its identity as aluminum hydrate was demonstrated by Dr. Germer and Mr. Storks, of the Bell Telephone Laboratories in New York, using one of the most modern and sensitive processes known to physics—electron diffraction. Both chemical and physiological tests indicate that the protecting action of the aluminum hydroxide on the quartz dust is substantially permanent, and that the only thing necessary to make the quartz dust harmless in the body is to bring it in contact with enough of the colloidal aluminum hydroxide so that it can coat itself with this film. For this purpose, the aluminum dust must be in close contact with the quartz dust: experiments showed that when the quartz dust was inhaled by the rabbits it did no good to give them aluminum with their food or to inject it into their veins, but that they must inhale the aluminum dust so that it could be deposited with the quartz dust in the lungs. The fact that certain "anti-dotal" rocks are able, when present in the dust of certain mines, largely to prevent the development of silicosis, is ascribed by the Canadian scientists to the fact that these rocks contain small amounts of soluble aluminum salts which produce aluminum hydroxide in the lungs.

Can Take It Later

Experiments showed that it was not necessary that the aluminum dust should be inhaled at the same time as the quartz dust. Rabbits that inhaled aluminum dust for 40 minutes each morning were completely protected, although they inhaled quartz for the next 12 hours. The only condition seems to be that the amount of aluminum dust deposited in the lungs should be at least about one per cent. of the weight of the quartz dust, and that this aluminum dust should be distributed fairly uniformly with the quartz dust, so that it can get at it and act upon it.

RADIAL ICICLES

They formed on the hub caps of a car driven along a slushy road, with the air above it hovering just under freezing point. The whirling of the wheel furnished centrifugal force to substitute for gravity, so that the icicles formed pointing away from the hub center instead of hanging straight down. The heavy "V" pattern follows a trademark. This unique picture was snapped in Ithaca, N. Y., by Dr. Harley Howe, professor of physics at Cornell University.

Perhaps the most interesting experiments, from the standpoint of the treatment of silicosis, were those which indicated that if rabbits which had already developed silicosis and whose lungs contained considerable quartz dust were allowed to inhale a little aluminum dust each day, the quartz dust was not only rendered inactive but was steadily removed by the lung phagocytes, so that it was carried out of the body, and the further progress of the disease might be expected to be prevented. One of the most characteristic and serious things about silicosis has been the fact that when the quartz dust has once been deposited in the lungs the irritating and poisoning action continues for years, and the patient gradually gets worse. These experiments give hope that by the inhalation of aluminum much of this quartz dust may be removed, and the progress of the disease retarded or even stopped.

Science News Letter, March 18, 1939

A Swedish archaeologist has dated a Swedish fortress as having been built in the fifth century, by comparing timber in the building with tree-ring records from America's sequoia trees.

PSYCHOLOGY

Mike Debunks Idea That Apes Are Not Fond Of Bathing

When Faced With Frequent Baths for Cure of Skin, He Surprises Attendants With His Enthusiasm for Soap

WATER is rather commonly supposed to be a substance as sedulously shunned by monkeys and apes as it is by their obvious relatives, small boys. Yet there is a young orang-utan in the New York Zoological Garden who has had a lot of baths. With soap. And he loved 'em.

The ablutions of Mike (for that is our hero's name) make a fascinating tale, as told by William Bridges, of the New York Zoological Society.

Mike was only three or four years old when he came to the New York Zoo, but he already had a university career behind him. He had been at the Johns Hopkins University, collaborating there with Prof. Adolph H. Schultz in researches on ape psychology. Mike did the psyching, while Prof. Schultz made observations and took notes.

The experiments in Baltimore ended, Mike went on up to New York to begin his real career as entertainer and instructor in zoology to the visiting public. But he could not be permitted to begin work at once. He had, alas, contracted some diseases. Nothing particularly serious, to be sure, but still not to be taken into the exclusive confines of the Zoo's primate house. So he went to the animal hospital.

The ails of his little insides yielded quickly to medicine, which Mike swallowed with great docility, not even having to be admonished to "take it like a little man." In two weeks that part of it was all cleared up.

More serious was an external disease, due to a parasitic fungus, that made his skin harsh and rough and deprived him of most of his hair. The only treatment indicated was a thorough bath every other day, followed by a rubdown with baby oil. After about six months of that, plus new elements in his diet, Mike was a changed little orang-utan, ready to be installed in his permanent quarters.

Mike's bathtub was a deep service sink. An attendant would put him into the warm water, lather him thoroughly with good soap. Mike never wriggled or protested in any way. He even co-operated, taking up the bath brush and scrubbing vigorously at that inaccessible spot right between the shoulder-blades.

Unlike his hominid cousins of comparable years, he was no soap-hater. He even experimented with it as a possible article of diet. When he found out that it wasn't meant to be eaten, he put the bar down and continued his brushwork, sitting on the drain-board of the sink.

Finally, rinsed clear of the soapsuds and dried off, he would lie completely relaxed on the hospital operating table, while the attendant kneaded baby oil into the skin of his back and neck and head. Mike simply couldn't get enough of this. The attendant's fingers generally wore out long before Mike's patience.

Diet was a problem. Apparently Mike had been fed almost exclusively on bananas and milk; at any rate, those were the only foods he would accept readily. And the milk had to be served just so, in a bottle with a nipple.

This needed extension in the young orang's education took weeks of time and endless patience, but the list of things Mike would eat gradually expanded, until the following items were added to the original milk-and-banana monotony: apples, oranges, cabbage, carrots, lettuce, prunes, apricots, raisins, celery, rice pudding, pablum, bread, codliver oil, bone meal, iron salts.

He got over his babyish insistence on milk through a nipple and learned to drink it right out of a bottle, like a "reg'lar feller."

Also, his devoted friend and attendant, Herbert Knobloch of the animal hospital staff, brought him a corn muffin and half a bar of milk chocolate every day. Mike was feeding on the fat of the land. And he showed it. He was a strong, healthy, alert, downright swagger young simian gentleman, ready at last for his public career.

He celebrated his final day in the hospital with one last, long, luxurious bath, while the Zoological Society's photographer, Edward R. Osterndorff, snapped picture after picture.

Science News Letter, March 18, 1939

A troublesome potato disease which leaves the fields looking scorched is called the "Z" disease of potatoes, because little is known about it except that a parasitic fungus causes it.

NOT BAD

This water is just right, says Mike as he starts his dip (left). Ah—that's the spot! (center). But I think I'll get out where there is plenty of elbow room. The fellow who put a long handle on a brush knew just how an ape feels.

IT'S FUN

That soap feels nice and creamy—wonder how it tastes. H'mm, I believe I like bananas better. But this oil rub is a real treat. He can keep this up just as long as he likes.

PSYCHIATRY

Medical Officer Announces Plans For Psychiatry in War

Elimination of Psychopaths From Recruits First Duty; Field Mental Hospitals and Preventive Service Planned

FIRST steps for mobilizing the U. S. Army and Navy in the event of war will be taken by psychiatrists. Plans are already formulated in detail for expert attention to the mental makeup of the human part of the war machine when M-day comes.

They are now revealed by Capt. Dallas G. Sutton, assistant surgeon general of the U. S. Navy in an article appearing simultaneously in the scientific journal, *Psychiatry* (February) and the service journal, *U. S. Naval Medical Bulletin*.

Psychiatrists, Capt. Sutton said, will first strive to weed out psychopaths and potential victims of mental disease from the mass of individuals who will be rushed into the armed services. Normally, the Army and Navy face a "very considerable" loss of man-days in the study and hospitalization of mental cases.

Elimination of unbalanced recruits is more important, he indicated, than measuring their intelligence. The "nut" can't get along in the armed forces, the "dumbbell" can.

"The psychopath has more difficulty in adjusting to the Service than has any other type of questionable individual," Capt. Sutton declared. "A recruit in this classification is not amenable to discipline and he ordinarily cannot comfortably be assimilated in any part of the organization without having an influence on morale.

"The constitutionally inferior and the medium-grade intellectual types are ordinarily acceptable if properly classified and utilized in the proper locations within the organization."

Groups of physicians, thoroughly trained to recognize mental diseases and persons subject to them, will be distributed throughout Army cantonments and Navy training stations to make this mental study of new recruits on M-day.

Men who pass this scrutiny will nevertheless also be carefully watched for a preliminary period so that borderline cases can be eliminated early in their training.

Mental hospitals will be established in the field for treatment of those men who, despite care in selection, collapse under the mental strain of modern warfare and Army life. Cases of shell shock and war neuroses will not be sent home as they were in the early part of the World War; they will receive immediate treatment at the front.

In addition to the important services of selecting the mentally fit and treating the mentally invalided, psychiatrists hope to render an even more important service in preventing the mental cracking of fighting personnel. Men in key positions, particularly, need protection against ill effects from dangerous over-fatigue, worry, responsibility and the tragedies of war.

Editorial comment in the journal, *Psychiatry*, to be republished in the *U. S. Naval Medical Bulletin*, emphasizes the need for this sort of preventive psychiatry. The demand is for a new science which must be built up to fill this need, it is pointed out.

"A preventive psychiatry that can deal practically with regimented groups of adolescents and adults—the people making up the military and naval forces—cannot readily be extrapolated from current child psychiatry, or from the experience of mental health clinics connected with high schools and colleges," the editorial declares.

The psychiatrists who are specializing in developing new treatments for mental disease would not find their interests fitting in with combat service, it was indicated.

"The recent, in some places quite unbridled, interest in pharmacodynamic shock therapy (insulin and metrazol treatment) is also far from the service ideal," the editorial stated, "and its exponents as yet show little tendency to develop what might be called therapeutic perspective.

"It would not be surprising if one of these enthusiasts were to recommend metrazol convulsions as the ideal treatment for cases of 'shell shock.'

"It might even transpire that a preliminary convulsion would be recommended on the way to combat positions —to remove the terror of the known destructiveness, a trifle compared with the terror connected with the convulsion."

Research in the field of preventive psychiatry is urged, "not only in the interest

of national defense but also for the advancement of public welfare."

"The vast reservoirs of man-power now going to waste is the grievous shame of today," the editorial declared. "The disintegration of personality that attends this wastage is simply damnable.

"It is a satirical reflection on our best of possible worlds that only in times of national emergency does human ability stand out as the basic national wealth."

Science News Letter, March 18, 1939

PHYSICS

Larger Atoms Eons Ago Allow Non-Expanding Space

ATOMS eons ago might have been larger than they are now. That is the latest hypothesis suggested to save science from an expanding universe.

The experimental fact that needs explaining is the famous red shift in the spectra of far distant nebulae. When astronomers with their giant telescopes view the great aggregations of stars they find that the rainbows of their light are a bit different than they would be if their light originated closer to us.

The obvious way to explain this is by the Doppler effect, that is, that the frequency of the light changes as the source rushes away, just as the pitch of a locomotive whistle or automobile horn changes as it rushes past. The greater the change, the faster the speed. In the case of the nebulae, the greater the red shift the faster the speed of recession. These speeds of recession appear to be very closely proportional to the distances of the nebulae from us.

Einstein's general theory of relativity provided a simple explanation of such a recession, but introduced some dilemmas. One of these is the time that the universe has been in existence. If the red shifts of the nebulae represent real motions of recession as relativity theory requires, then the age of the universe can hardly be more than a few thousands of millions of years. This would be decidedly embarrassing to both astronomers and geologists. For radioactivity of rocks points to an earth age of two to three thousand million years, and evidence from stellar motions seems to point to an age of millions of millions of years for the universe.

Perhaps the trouble is that constants have been inconstant. There have been several suggestions along this line; for example, the half-period of radium's life, now 2000 years, may have been something quite different in past ages, the gravitation constant has changed as the universe aged, etc.

From Prof. S. Sambursky of the Hebrew University of Jerusalem comes the idea that the atoms of the universe have decreased in size with time. Larger atoms emitted millions of years ago the spectra that now appear to be shifted to the red. The universe is static and we cannot judge its size.

Science News Letter, March 18, 1939

MICROBIOLOGY

World in a Water Drop Shown at New York Fair

Microvivarium, Which Packed 'Em in at Century of Progress, Is Expected to Repeat Success During the Coming Summer

See Front Cover

THE WORLD in a water drop, magnified so that minute microbes look as big—and as lively—as jackrabbits, will be shown to visitors at the New York World's Fair in the Microvivarium, of which Dr. George Roemmert of this city is inventor and exhibitor. The Microvivarium will be housed in the Westinghouse building.

This instrument is a combination of microscope and projection lantern. Powerful beams of light, projected through trains of lenses, project the images of living one-celled plants and animals on screens so that the audience can see the intense dramas of their little lives plainly and on the largest scale. Dr. Roemmert will have twelve of these projectors in operation at once, so that the show will be large and varied. A Microvivarium of an earlier model was one of the outstanding successes of the Chicago Century of Progress, so that it is anticipated that thousands of people will flock daily to the larger auditorium which has been erected here.

Strange Mating

Among the manifold scenes of life in the usually invisible world is a display of the mating of the slipper animalcule, or paramecium, a one-celled animal that lives in stagnant fresh water. This is something that not even scientists had been able to demonstrate until recently.

Usually the paramecium reproduces by simply dividing in two, each half then swimming off and rapidly growing to full size. But in this microscopic romance two individuals swim alongside of each other for a while, exchange half-nuclei, and then go their separate ways again.

Contrasted sharply with this primitive foreshadowing of that which makes the world go round is a swift scene of tragedy that ensues when Dr. Roemmert releases into a field where paramecia are swimming about a number of fierce little carnivorous microbes, called nose-animals because of the little beak-like projections they bear. Although they are smaller than their prey, they attack with the ferocity of tigers and quickly devour the hapless slipper animalcules.

Other tiny animals shown in the Microvivarium are shaped like tiny bells, that stand bottom side up at the end of long, slender stalks. A fine muscle-like fiber runs down through each stalk, so that when the little animal feels danger near, or just wants to for any other reason, it pulls itself down like a flash by contracting the usually straight stalk into a tight spiral like a coiled spring.

The Microvivarium is also used to show the details of the inner lives of some of the smaller many-celled animals, particularly minute worms, insect larvae, and microscopic relatives of crabs and crayfish. It shows, for example, the writhings of vinegar worms, the swallowing movements and heartbeats of a mosquito larva and the unborn young in the brood-pouch of the minute crustacean known as the water-flea.

Science News Letter, March 18, 1939

●RADIO

H. T. Herrick, assistant chief of the Bureau of Chemistry and Soils, U. S. Department of Agriculture, will be guest scientist on "Adventures in Science" with Watson Davis, Director, Science Service, over the coast to coast network of the Columbia Broadcasting System, Saturday, March 25, 6:15 p. m. EST, 5:15 p. m. CST, 4:15 p. m. MST, 3:15 p. m. PST. Listen in on your local station. Listen in each Saturday.

AVIATION

M. I. T. Metcalf Blind Landing Passes First Flight Tests

Using Micro-waves of 17 Inches Device Provides Static-Free Path for Landing; Only One Instrument

PERFECTION of a virtually foolproof blind landing system for airplanes seems assured within the next year or two, following successful tests at East Boston Airport of major elements in a new radio-beam method developed by Massachusetts Institute of Technology scientists and Irving R. Metcalf of the Civil Aeronautics Authority.

Radio micro-waves only 17 inches long, the shortest ever applied to aeronautical radio, provide a straight, static-free path down which an airplane can make a normal "straight" landing glide to land smack in the middle of the runway, no matter how thick the weather outside the cockpit. The plane is in the proper position for a landing at all times during the glide.

There is only one instrument for the pilot to watch, and it may be used to simplify regular instrument flying as well. The apparatus, when finally assembled, will be extremely light. It is the first blind landing system whose principle—the straight glide path—meets the requirements of hardboiled Army fliers.

Actual flying tests were conducted by the scientists in a small plane owned by the C. A. A. which proved that a "spotlight" beam of extremely high frequency radio waves can be used effectively as part of a trail blazer for airplanes trapped in fog.

Three lighted dots in a cathode ray tube instrument in the pilot's dash board tell him whether he is on course or, if he is not, in what way his position is wrong. When the three lights are lined up horizontally, with the middle dot properly centered, the plane is on course.

The plane's gyroscopes, indicating bank and climb, control movements of the outer lights. The center light is controlled by four overlapping "spotlight" beams of radio micro-waves. When the plane follows the straight glide path—the area in which the four beams meet—the signals of the separate radio beams will be equalized, and the center light will remain on center. If the plane rises or falls, or moves to left or right of the path, the relative signal strength of one of the beams will increase, and the spot will be deflected in that direction.

The Metcalf-M.I.T. system has other advantages as well as inherent simplicity. The signals are not reflected from the ground and hence are independent of ground conditions. Because the instrument follows the relative strengths of four signals sent out by the same transmitter, the absolute volume of the four signals makes no difference. This is not true of previous blind landing systems, which have required cumbersome, sensitive apparatus to overcome this difficulty.

Originally suggested by Mr. Metcalf, the system's development has been made possible by the cooperation of Profs. Edward L. Bowles, W. L. Barrow, W. M. Hall, and Charles S. Draper. Army, Stanford University and Sperry Gyroscope Company experts have also cooperated.

The basic idea was first used by Mr. Metcalf in guiding a landing by three visible lights on the ground. One light was at ground level, at the center of the runway. Two other lights were located on either side of the runway, at an appropriate height from the ground. If the pilot lined up the three lights in a row, he made a good landing. C. A. A. pilots made scores of semi-blind landings with this system, observing the lights through a ground glass screen.

The straight glide path is superior to the curved path provided by earlier systems using radio waves reflected from the ground. In following a curved glide path, the pilot must often change his angle of descent. Moreover, the curve flattens out toward the ground. Just as the plane is closest to making an actual landing, therefore, it is moving forward much faster than at the top of the glide.

Radio micro-waves held many advantages for the new system, but the problem was to find a transmitter which would generate sufficient micro-wave energy to activate a receiving set at least two miles away. Tests indicate that the new klystron tube, developed at Stanford University, holds the answer. Signals generated with a tube operating at 300 watts output were picked up with a crude one-tube receiver on a plane eight miles away.

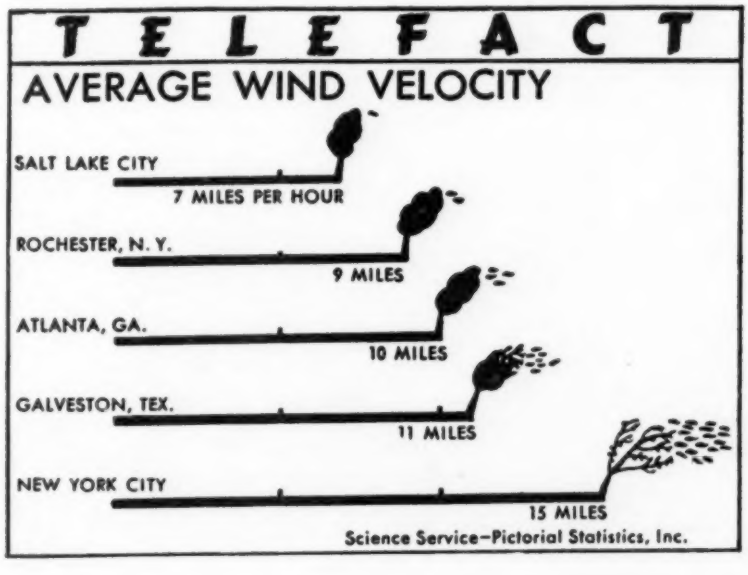
Science News Letter, March 18, 1939

PLANT PHYSIOLOGY

Growth-Retarding Substance Discovered in Plants

A GROWTH - RETARDING substance, having effects opposite to those of the already well-known growth-promoting substances or auxins, has been discovered by Drs. Wm. S. Stewart, Wm. Bergren and C. E. Redemann of the California Institute of Technology. Placed in contact with living plant tissues, it slows down their growth. (*Science*, Feb. 24)

Science News Letter, March 18, 1939



PHYSIOLOGY

Adrenal Gland May Produce Hormone For Salt Control

A NEW discovery in the field of endocrine gland research appears in a report by Drs. Frank A. Hartman, Herbert J. Spoor and Lena A. Lewis, of Ohio State University. (*Science*, March 3)

The adrenal glands, tiny cocked-hat-shaped organs close to the kidneys, produce not merely two but three hormones or chemical messengers, the scientists believe as a result of their latest investigations.

The newly-discovered hormone, the studies indicate, is responsible for keeping the sodium part of salt in the body. This important job has heretofore been attributed to the life-essential hormone from the outer part of the adrenal glands. Dr. Hartman previously obtained a potent extract of this hormone from the outer part of the glands which he called cortin, and which has saved many lives threatened by the adrenal gland disorder, Addison's disease.

He and his associates have now separated from this extract the substance which they believe is another hormone responsible for salt retention. This newly-discovered hormone, however, will not maintain life without cortin, although cortin will keep animals alive without the aid of the salt-controlling hormone.

First of the adrenal gland hormones is the familiar adrenalin or epinephrine produced by the inner portion of the glands.

Science News Letter, March 18, 1939

PSYCHOLOGY

Frustrations Fill Life Leading to War and Hate

THE LIFE of man is filled with obstacles, deprivations, and thwartings. From the time the bottle is taken away from the protesting infant to that dread hour when he unwillingly faces loss of life itself, frustration follows frustration.

War, industrial strife, fierce economic competition, and brutal crime can all be traced to this inevitable series of frustrations, we are told by a galaxy of psychologists at the Institute of Human Relations of Yale University writing in a new book *Frustration and Aggression* (Yale University Press).

In America, babies early learn resentment when they must conform to artificial feeding schedules. All good mothers who read books on infant care know that baby's feeding should conform not to the pangs of hunger but to the clock. It is not easy to explain this to the infant.

And suppose he discovers a partial satisfaction in sucking his thumb. The baby book says no. His hands are bound, or covered; bitter substances destroy his comfort.

When baby wants to touch and grasp and put into his mouth, again he is hindered. Any number of tempting objects are *verboten*. He mustn't grab the Wedgewood vase or pound blocks on the piano. He mustn't put lighted cigarettes into his mouth. Wise parents will put a toy in his hands to substitute for forbidden things. But not all parents are wise.

In school, freedom is gone; he must learn to sit still. Harder still, he must learn not to talk.

In adolescence, the curbing of desires becomes almost intolerable and storms of protest and insubordination result.

But manhood brings no truce. Marriage must be postponed, loved ones relinquished, jobs lost, ambitions thwarted, and social standing imperiled. Depressions throw millions out of work and reduce them to abject poverty and humiliation.

It is small wonder that resentments smoldering in the breasts of men for a whole lifetime sometimes break into the flames of war and hatred.

If conflict is to be avoided, these psychologists warn, some means must be devised to reduce the frustrations that goad all men.

Science News Letter, March 18, 1939

MEDICINE

Vitamin C Not Remedy For Rheumatic Fever

ANTI-SCURVY vitamin C, in citrus fruits, tomatoes, or other fruits and vegetables, is good for everyone but the idea that it is a specific remedy for rheumatic fever has been exploded by Dr. M. P. Schultz, U. S. Public Health Service expert on the rheumatic fever problem.

Children with rheumatic fever should not be forced to eat excessive amounts of the foods containing this vitamin, he warned, because they may then not eat enough of other necessary foods.

Rheumatic fever is the most common cause of heart disease in children, but the cause of rheumatic fever is still unknown. One theory is that lack of vitamin C in the diet is an essential factor in development of rheumatic fever. Studies disproving this theory are discussed by Dr. Schultz and associates in a *Public Health Service Report*.

Science News Letter, March 18, 1939

IN SCIENCE

GENERAL SCIENCE

Chinese Scholars Appeal For Scientific Reprints

AN APPEAL for scientific books and pamphlets for the use of Chinese scholars has been received in Washington. The sender, T. L. Yuan, acting director of the National Library of Peiping, states that since the Japanese occupation of the Chinese capital, the facilities of the library are not available for the use of Chinese scientists.

Emergency quarters have been set up in the city of Kunming, Yunnan province. Mr. Yuan asks that American scientists contribute reprints of their publications as far as they are able, and he appeals also for books and monographs.

Contributors are requested to send their publications to the International Exchange Service, Smithsonian Institution, Washington, D. C., whence shipments to China are made once a month.

Science News Letter, March 18, 1939

AGRICULTURE

Strawberry Clover Favored For Wet, Alkaline Lands

STRAWBERRY clover, a forage plant that loves wet soil and can tolerate relatively high concentrations of alkali, is recommended for use in seepy and alkaline fields by the Bureau of Reclamation, U. S. Department of the Interior. Tests during the past few years in the West have proven the plant to be of such merit that its general adoption is now encouraged.

Strawberry clover is so named because it propagates itself, after it once gets a start from seed, by throwing out long runners that root at the tips, after the manner of a strawberry plant. Its botanical name, *Trifolium fragiferum*, is a reference to this resemblance: Fragaria is the scientific name of the strawberry.

This relatively new clover apparently came to the United States from Australia, in lots of mixed seed intended for pasture sowing. In some of the earlier plantings it has not only persisted after the grasses with which it was mixed but has even driven out salt grass, foxtail and other aggressive weeds.

Science News Letter, March 18, 1939

NCE FIELDS

AVIATION

Britain's Flying Bombers Faster Than U. S. Navy's

GREAT Britain's flying boat bomber, the Short Sunderland, largest in regular military service in the world, is faster than the corresponding, but older, U. S. Navy type, the twin-engined Consolidated PBY, Air Ministry figures disclose.

The Sunderland's four engines pull it through the air at a top speed of 210 miles an hour, it is claimed, considerably in excess of the PBY's performance. Two experimental four-motored naval bombers, built by Sikorsky and Consolidated for the U. S. government, are believed, however, even to outperform the Sunderland.

The British naval bomber, whose gross weight of 45,000 pounds makes it twice as large as the Consolidated two-engined planes, but 15,000 pounds lighter than the two new American boats, is a military version of the Empire flying boat. The Cavalier, as well as its expected successor, the Champion, was of the Empire type.

The Sunderland is Great Britain's first patrol bomber on the American style. It can carry nearly a ton and a half of bombs about 1650 sea miles.

Science News Letter, March 18, 1939

CHEMISTRY

Research Speeded To Aid King Cotton

WIDESPREAD announcements of new research that produces fibers rivalling natural silk and wool may seem to fashion the erroneous picture that scientists are doing but little to find new and better ways of utilizing cotton. Scientific research aid for King Cotton, however, is rapidly being developed.

Directed by Dr. Lawrence W. Bass of famed Mellon Institute for Industrial Research at Pittsburgh, new ways of using cotton are being found through research.

One new application of cotton, and an important one potentially, is the use of cottonseed hulls as the basic ingredient of a better sweeping compound. Thrown on the floors of office and factory buildings the mixture is swept up with a broom and gathers—as it is pushed about—the fine particles of dirt and dust.

Past mixtures for sweeping compounds have been made of sawdust or of mixtures with many ingredients like sand, salt, mineral wool, molasses, ground cork, corn cobs and so on.

To Dr. Bass and his colleagues it seemed that cotton hulls, with their fine fibers, might act like a dust cloth and catch the dirt. Experiment showed that hull bran from cotton seeds made a very satisfactory sweeping compound. Over a ten-year period the price of hull bran has been very low, only $5 a ton, so that the cost of the sweeping compound should be low when it goes on the market in commercial quantities.

Best mixture so far found is one containing 95.6 per cent. cottonseed hull bran and 4.4 per cent. paraffin oil. In tests on pulverized talc the cottonseed sweeping compound picked up all particles. Comparable tests with a sawdust base compound showed a pickup of only 40 per cent.

Science News Letter, March 18, 1939

ETHNOLOGY

Study of Indians Shows What Hard Times Were Like

ROVING Indians who tried to wrest a living from the sagebrush country west of the Rockies offer modern America a striking picture of hard times.

A 12-year study of these Ute, Paiute, and Shoshoni Indians has just been reported by Dr. Julian Steward of the Smithsonian Institution. His investigation took him among some isolated groups never before studied by ethnologists.

Until a few generations ago, he reports, this area supported just about the most elementary form of society known to mankind. The people lived by gathering nuts and fruits and by hunting deer, mountain sheep and antelopes when they could get them, or if not, by eating rabbits, gophers, rats and mice.

There was a comparative famine belt, where starvation and cannibalism were real problems. The individual family or a few related families formed the largest permanent unit of society, because there was too little food for large groups. In a few fertile areas, from 50 to 100 persons established themselves in a fortunate band, working and dancing together, with permanent leaders.

Science News Letter, March 18, 1939

ENGINEERING

Cylinder Fuel Injection Produces Greatest Power

INJECTION of fuel directly into the cylinders of an aircraft engine produces the greatest output of power, two National Advisory Committee for Aeronautics scientists have determined at the N. A. C. A.'s Langley Memorial Aeronautical Laboratory.

Tests conducted on a single-cylinder experimental engine proved that the greatest amount of air and fuel can be put inside a cylinder by this means, as compared with manifold injection and carburetion.

Science News Letter, March 18, 1939

ENGINEERING

Chinese Building Railroads In Midst of Japanese War

WAR with Japan is bringing China at least four more railroads than have been previously reported, some of them almost under the noses of the Japanese invaders, Norman D. Hanwell, Far Eastern expert of the Institute of Pacific Relations, said.

A branch line of the long line connecting Kweilin in southwest China with Chuchow, near the central Chinese coast, will connect Hunan and Kweichow provinces in western China. Two hundred kilometers, about 125 miles, are already reported under construction, Mr. Hanwell declares.

Sian, where Chiang Kai-shek was held prisoner by Marshal Chang Hsueh-liang more than two years ago in an episode of importance on the road to the Sino-Japanese war, is to be connected with Lanchow, capital of Kansu province in the northwest. Rails are being pushed westward from Paoki, which is already connected with Sian. The line may facilitate shipment of Russian munitions to the Chinese.

A line is being pushed south from a point south of Wuhu, Yangtze river port now occupied by the Japanese.

Fourth, the Kweilin-Chuchow line itself is partially new, for the stretch Nanchang to Chuchow was opened on Jan. 9 of this year.

Equipment from another railroad which has figured in the news—the narrow-gauge French line from Djibouti to Addis Ababa in Ethiopia—is also to be brought into China to provide additional rolling stock for the overworked narrow-gauge road from Indo-China to Yunnan, Mr. Hanwell also reports.

Science News Letter, March 18, 1939

ARCHAEOLOGY

Unhappy Tax Collector

But His Broken Bowl, Unearthed Near Jerusalem, Reveals Time When Joshua Conquered Canaan

By EMILY C. DAVIS

SO YOU didn't like the idea of paying your income tax? Neither did the Canaanites back in Bible days.

A broken bowl unearthed in ruins 25 miles southwest of Jerusalem has revealed a tragic tale of a tax collector. We don't know the man's name. We do know that he lived in a city on a hill that the Old Testament mentions frequently. It was called Lachish, meaning invincible.

The tax collector was there in nerve-racking days when war was in prospect. Joshua was leading a band of invading Israelites into southern Palestine, and boldly marching up to "invincible" Canaanite cities, like Lachish, and smiting them with the edge of the sword.

Poor Canaanites, and poor tax collector!

Death and taxes, as wise Ben Franklin later commented, were the two things they could count on. And both unpopular.

The tax collector's bowl, which archaeologists pronounce a very remarkable object indeed, was dug up by British archaeologists of the Wellcome-Marston Research Expedition to the Near East.

Piecing together the 25 scraps of the badly smashed bowl, the archaeologists found that an ancient tax man in Lachish must have used this clay dish as a memorandum tablet. There was no writing on cuffs in those days. No scratch pads. People in Palestine wrote on clay, and economically used up broken dishes as note paper.

Record Bowl

But this tax gatherer among the Canaanites had kept his records on a good, usable clay bowl. Maybe he used the bowl in measuring small tax payments.

What the archaeologists have spelled out on this bowl is written in Egyptian. Naturally, Egyptian, since Palestine at that time was under the thumb of Pharaoh. And the notes on the bowl mean something like this:

Twelve quarters of wheat from the harvest of Farmer Ati in the fourth year.

Seven quarters of wheat from the harvest of Farmer Nabu in the fourth year.

And so on. There had been a procession of local farmers, Canaanite tax payers, all handing over wheat to Pharaoh. And every payment was dated "the fourth year."

The fourth year of what? That isn't hard to say. Dates in Old World history generally were figured from the succession to the throne of some current reigning monarch. The tax collector's calendar ran in terms of pharaohs.

But which pharaoh's fourth year was it? That is more of a puzzler. Specialists in Egyptian have been consulted, however, and believe they have the answer. They judge from the writing, and other clues.

In a recent issue of *The Biblical Archaeologist*, editor G. Ernest Wright, of the Presbyterian Theological Seminary in Chicago, sums up the verdict on what the tax collector meant by his year four:

"Specialists in Egyptian say that the writing is to be dated about the time of Pharaoh Merneptah, not before; and Professor Albright has pointed out in an argument which is almost irrefutable that the 'year four' on the bowl almost certainly refers to the reign of Merneptah and would therefore be about 1231 B. C."

A Key

And there you have a key to figuring the time when Joshua was conquering Canaan. You also know which proud Egyptian monarch had to hear the reports of Israelite victories in one of Egypt's tribute-paying provinces.

Archaeologists have long searched for enough good evidence to pin down the dates associated with Moses and the conquest of Canaan. They are now rapidly narrowing down the times when events must have happened, into definite centuries, then definite decades. Sometimes, they can be almost certain of an exact year.

Ours is the first age since ancient history in which any one can know when these famous events in the Bible occurred.

Our grandfathers relied for their Old Testament dates on Archbishop Ussher, seventeenth century divine. Ussher was convinced that the world was created in the year 6006 B. C. This and some of his time errors are still preserved in margins of many a household Bible.

But archaeology, which has been an active science for less than a hundred years, is digging up evidence for real dates which Bible scholars can accept. It begins to seem likely that the Israelite invasion of the Promised Land was not a single campaign.

Rather, as explained by Prof. W. F. Albright of the Johns Hopkins University, some Israelite tribes left Egypt about a century before the famous Exodus led by Moses via the Red Sea and the wilderness. And these earlier Israelites captured Jericho between 1360 and 1320 B. C. Nearly a century later arrived the Exodus contingent, to fight under Joshua for more Canaanite cities, about 1235 to 1200 B. C.

Joshua Not At Walls?

If Prof. Albright is correct, then Joshua wasn't at the walls of Jericho —his most famous battle! Walls of Jericho, unearthed in the past few years, apparently fell between 1360 and 1320 B. C. And yet the evidence is narrowing down to show that Moses must have led the Children of Israel away from Pharaoh's clutches along about 1290 B.C. Prof. Albright's conclusion that there were two Exoduses, cuts the Gordian knot.

Returning to the tax collector in Lachish—his bowl is a rare bit of evidence to help in this dating. And all because the tax collector was an efficient man who dated his work.

Here is how Bible scholar-detective-archaeologists deduce that Lachish must have been besieged by Joshua just about the year 1230 B. C.:

The broken bowl was found in the debris of a great fire in the Canaanite city at Lachish. And the smashed pieces lay together. Hence, the bowl was obviously used prior to the fire, and was obviously broken in the catastrophe. And since the year four was written so plainly on the bowl, repeatedly, the bowl must have been broken after that date. Probably it was soon after, or there would have been some "year five" records on the bowl.

We can imagine the tax collector, prob-

EVIDENCE

On this broken bowl, a tax collector kept records of tax payments in a Bible town, in the days of Joshua. Now the bowl is valuable evidence—not of delinquent tax payers—but for proving when Joshua lived and fought his mighty battles.

ably an Egyptian, going about his unpopular job of personally collecting for his government, from the reluctant people who lived in and around the fortress-city on the hill. And then his records and work were smashed—and there is considerable probability that the tax collector's head was as rudely shattered as his bowl, though it is true that no one has found his skull in 25 fragments.

It would perhaps be demanding too much of poetic retribution to imagine among the storming party of Joshua's men some of the disgruntled local farmers of the neighborhood, and to fancy them breaking in upon the hated tax collector and cracking his head with his own record-bowl. Enough to know that the visible record of foreign taxation was smashed. It was one tiny incident in a day of wild destruction. And no Canaanite there, nor the employee of Egypt, had any idea that this ordinary clay bowl would become a thing to study historically, over 3000 years after.

Two-Day Battle

Lachish held out against Joshua two days, where a good many Canaanite towns had been ticked off in one. The invincible hill was taken, and the bonfire lighted the landscape for miles around. Its petty king Japhia had already died. He was hanged along with four other city-kings who had made a futile alliance and tried to scare off Joshua in a battle north of Jerusalem. Joshua marched on, wiping out idol-worshipping natives right and left.

Perhaps you have wondered what it would be like to worship the strange idols so denounced in the Old Testament. In the burned wreckage of Canaanite Lachish, archaeologists unearthed foundations of a temple with so much evidence of the plan and equipment that they — and you — can understand Canaanite religion much better than any one ever has since the Canaanites were alive.

This temple was a low building of stone coated with lime plaster. The floor was hard clay. The roof was probably mud and straw over wooden supports.

Dr. Wright explains how it would seem to enter this temple to worship the images enshrined there.

"The worshipper," he says, "passed through a small vestibule to reach the sanctuary itself. Directly in front of him as he entered was the raised shrine with steps for the convenience of officiating priests. On the top of the shrine there stood, probably, the figure of the god for whom the temple was built.

"Around three sides of the room were benches, on one of which the worshipper placed his offering. On the right side of the shrine or altar was a pottery stand on which once stood a bowl for libation. To the left was a large bin for meat or grain offerings.

Small Hearth

"In front of the altar at its base was a small hearth, surrounded by a mud curb, which still contained charcoal from the last time it was used. By the libation stand was a niche for lamps. Possibly one of them was kept burning continually to provide fire for the burnt offering.

"At the rear were two rooms. To judge from their contents, one was probably a vestry for priests; the other a storeroom for the offerings."

Which deities were popular at Lachish is not yet discovered. Canaanites worshipped Baal, the love-goddess Astarte, and many others. A pitcher with Canaanite alphabetic writing on it was found in the temple, bearing the names of three deities, Shur, Mut, and Alat, who may have been worshipped as a divine family—father, mother, and son.

Evidence that Canaanites appreciated luxury and beauty is being found in their ruined cities. At the temple of Lachish an exquisitely carved ivory hand was found. It is very likely the hand of a goddess from the shrine.

A perfume flask shaped like a woman in a long skirt is a bit of Canaanite luxury, imported from Egypt. The head of the ivory woman is the perfume stopper, and a hand-shaped spoon is cleverly stuck in, to provide a ladle when needed.

An ivory comb and rod, both from the temple, apparently belonged to priests who had to keep elaborate wigs in curl.

We never think of Israelites and Canaanites exchanging war notes, or sending messages except by shouting. Yet both sides could write. And samples of Canaanite writing found in the temple ruins at Lachish are helping to fill in an important missing link in the history of the alphabet. This Canaanite writing fills the gap between alphabetic writings found at Mount Sinai done in 1900 B. C. by turquoise miners there, and writing done by Phoenician kings from about 1250 B. C.

Alphabet of Bible

This very Canaanite alphabet was adopted by the Israelites. In this Canaanite alphabet, the Old Testament was written. In chain fashion, the alphabet passed on from Phoenician to Greek to Roman—to us.

The Canaanite layer of ruins at Lachish is far from the only chapter in the mound's history. Before the Canaanites, there were people living in caves around the edges of the mound. In later times, the Hebrews had a very strong fort city at Lachish. It was besieged by Sennacherib's army, and later by Nebuchadnezzar. Ruins identified with these battles have been explored at Lachish. Letters on clay fragments written during the latter siege have been found and are cherished as wonderfully preserved contemporary records by Old Testament Hebrews, confirming the Biblical record.

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Science News Letter, March 18, 1939

"The anthropologist ought to be able to predict a little better than the politician about the future," said a British scientist, commenting on the usefulness of examining the past 6,000 years of human experience.

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PHYSICS

Uranium Atom Explosion Covers Range of Only an Inch

Measurement of Effective Cross Section of Neutrons Producing Such Splitting Is Also Just Announced

THE EXPLOSION of uranium atoms, with the release of enormous amounts of atomic energy and the production of two "splitter" particles which are probably barium and krypton, occurs over a volume of space about an inch in radius.

Dr. Edwin McMillan of the University of California radiation laboratory describes studies (*Physical Review*, March 1) which indicate that the splitter particles cast off by uranium in its new-found explosion and break-up have a "range" of 2.2 centimeters or nearly an inch.

The splitting of uranium by impact with neutrons (neutral atomic particles) is being hailed as the most important discovery in physics since radium and radioactivity were found at the turn of the century.

In another report credited to nine scientists at Columbia University estimates were given of the effective cross section of the neutrons which produce such uranium splitting. This cross section, for slow or thermal neutrons, is given as 2×10^{-24} square centimeters or .000,000,000,000,000,000,002 square centimeters. These slow neutrons have been found to be especially efficient in splitting uranium. Fast neutrons, found alone to be able to split thorium, are even smaller by a factor of 20 times.

From the Carnegie Institution of Washington's Department of Terrestrial Magnetism was the report of Drs. R. B. Roberts, R. C. Meyer and P. Wang that the uranium splitting not only gave off energy and two particles but also released a neutron. Potentially this neutron could strike a nearby uranium atom and perpetuate the release of atomic energy.

Science News Letter, March 18, 1939

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MEDICINE

Medical Prescriptions Can Soon Go International

MEDICAL prescriptions, or at least the drugs that are called for in the prescriptions, are soon going international with the aid of the League of Nations. Which means, among other things, that if you are travelling abroad and need some more of that medicine the doctor prescribed for your stomach trouble, for example, you will be able to get the prescription made up without the difficulty you had last time you were abroad.

Even if you have never travelled abroad and do not expect to do so, you may benefit from the limited international pharmacopoeia which is now in process of creation.

A pharmacopoeia is a book containing a list of products used in medicine, with descriptions and chemical tests for determining the identity and purity of the substances. The pharmacopoeia also contains formulas for certain mixtures of these substances and usually a statement of average dosage. The Pharmacopoeia of the United States is a legal standard for drugs and medicines in this country. Other nations have their own.

There is considerable variation in the strengths and composition of medicinal preparations as given in the different national pharmacopoeiae. This creates confusion not only in the case of the individual who needs to have a prescription filled while travelling in foreign lands, and with regard to treatment of ships' crews calling at different ports and replenishment of ships' medical chests, but also for manufacturers supplying the international market and for physicians investigating the value of a new treatment developed in a foreign country.

The move for an international pharmacopoeia to solve these difficulties started in Brussels in 1925. Material for it has been prepared and in May of this year a technical commission of experts, set up by the Health Organization of the League of Nations, will consider this material and approve a final form of what may then become the international pharmacopoeia.

Science News Letter, March 18, 1939

PSYCHOLOGY

Letter to the Editor— Pronunciation as a Trap

(Capt. Gregory is the scientist son of Sir Richard Gregory, for many years editor of the scientific journal, *Nature*. Capt. Gregory is at the Rothamsted Experimental Station, Harpenden, England.)

By CAPT. E. H. GREGORY

I WAS very interested in the short note that you published on page 91 of SCIENCE NEWS LETTER, February 11th.

The note had the heading—"Gangsters Use Metaphor as Escape From Reality."

It was the paragraph—"a way of identifying oneself with a certain group and aweing or mystifying the uninitiated"—that caught my attention.

There is no question that in this country pronunciation is used as a means of segregating groups of people. It is a far more accurate way of determining in what set a man or woman moves, than by judging the cut of clothes, or the size of bank balance.

There are certain pit-falls that have been devised, at least one can see no other reason, to enable this sorting out to be carried on.

As you know, it matters not how pronounced a man's Oxford accent may be, or what college tie he is wearing, his pronunciation of—Magdalen College as Mag'dalen College, tells you at once that he was never at Oxford.

It is Maudlin College.

The same thing applies to the—High Street, in Oxford, it is always called—"the High".

There are many other examples at Oxford.

At Cambridge, Caius College, is "Keys" College. The Kings Parade is always known as K. P.

The pronunciation of the name "Ralph"

is, Rafe, but the ordinary man in the street calls it Ralph.

Not many years ago it was the fashion of what may be called "the tweedy-gentry of England" to clip the "g", that is to say hunting, shooting and fishing, became huntin' (often 'untin') fishin', and shootin'. Ridicule has done a great deal towards killing this fashion.

The average Englishman says—girl, as it is spelt. The lower classes say—gurl, but the right people, say "gel" or a mixture of gel and gal, very difficult to pronounce.

From time to time these pronunciation "signs" undergo a change.

Many years ago "the best people" said "honour", that is sounding the "h", whereas now it is 'onour, but at that time hospital was pronounced 'ospital, dropping the "h". There can have been no reason for this, except that it was a deliberate trap.

As the father once said to his small son—"You may have Haddock and Ham at school, but in this 'ouse you 'ave 'addock, and 'am".

Quite recently, that is to say, within the past 15 years, it has become the fashion to pronounce "valet" as an English word, and not as a French, also in restaurant, the first "t" is now sounded by—"the best people."

Science News Letter, March 18, 1939

ASTRONOMY

Foreign Astronomers To Lecture at Harvard

OUTSTANDING foreign astronomers will join the visiting faculty of Harvard during the coming summer for the 1939 Harvard Summer Conferences on Astronomy.

Courses in stellar astronomy and seminars on celestial mechanics, star structure and other special problems will be given from July 5 to Aug. 15.

The following will be visiting lecturers during the sessions: Dr. Jan Oort, University Observatory, Leiden; Dr. Freeman D. Miller, Denison University, Granville, Ohio; Dr. Svein Rosseland, Institute of Theoretical Astrophysics, Oslo; Dr. Zdenek Kopal, University of Prague; Dr. Richard A. Prager, Berlin; Dr. E. F. Freundlich, Prague.

Science News Letter, March 18, 1939

American nurses, says the Pan American Sanitary Bureau, have made quite a name for themselves in such countries as Cuba, Chile, Panama, and Colombia where they have helped organize hospital and public health services.

ARCHAEOLOGY

Says Lost Viking Found America On Detour

LEIF ERICSSON sailed to America on a tip from a daring young Norseman who got there first. At least, so it appears from studies reported by a Norwegian archaeologist, Prof. A. W. Brogger of the University of Oslo.

How Leif Ericsson happened to sail on that voyage which landed him in Vineland, somewhere in America, has been almost as mysterious as the exact location of Vineland itself. It has been said that Leif was doing missionary duty, carrying Christianity to Greenland at request of King Olaf of Norway when he lost his way and discovered the land of the vine. But Prof. Brogger is convinced that Ericsson sailed to America deliberately, not by chance.

His conclusions bring into prominence a headstrong young Viking named Herjulvsson, who technically may be the discoverer of America.

The story is that when Leif Ericsson's father, Eric the Red, had sailed from Iceland to establish the first Norse colony in Greenland, in the tenth century, he had been followed by this young Herjulvsson, who got lost on the way and made a landfall in a strange country—Labrador. Herjulvsson got lost because he had insisted on navigating his own ship, despite inexperience. A hard gale and fog drove his ship away from the course, and the detour took him, so Prof. Brogger figures, to Battle Harbor, Labrador, thence back to Baffin's Land and to Greenland.

When Eric the Red heard of it, he dispatched his son Leif to investigate the strange land. The expedition, concludes Prof. Brogger, was a sound and well-prepared venture, conducted by 35 men set to repeat deliberately Herjulvsson's mistake. He says they reached Baffin's Land and named it Helluland; continued to Labrador and called it Markland; and then went farther than Herjulvsson to discover luxuriant Vineland.

Science News Letter, March 18, 1939

Advance Announcement

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PLANT PHYSIOLOGY

NATURE RAMBLINGS
by Frank Thone

Tree Thermostats

TREES have thermostatic methods of their own for resisting both freezing in winter and overheating in summer, Prof. E. S. Reynolds, plant physiologist of Washington University and of the Missouri Botanical Garden, has discovered in measurements of tree-trunk and air temperatures over a period of four years.

Prof. Reynolds inserted automatic, recording, electrical resistance thermometers in the heart of a tree-trunk and in the cambium or growth layer just under the bark. He also used a similar, shaded instrument to record the air temperatures alongside those of the trees.

In the winter period the tree temperatures changed more slowly than the air temperatures. The lag became especially pronounced just when the temperature reached the freezing point. Often for a period of 24 to 60 hours after the air temperature had dropped several degrees below the freezing point the tree temperatures remained steadily at about the freezing point.

Likewise when the air temperature rose well above the freezing point the tree temperature would not pass above this point for a long time.

However, once this point was passed in either direction the temperature of the trunk followed that of the air rather closely. Dr. Reynolds regards this more or less extended period of steady temperature at the freezing point as dependent upon the release of heat during the freezing of the water in the tree and the equivalent absorption of heat later in the process of melting the ice.

Resistance to extreme temperatures in summer followed a different pattern. Thus under these conditions the temperature at the center of the tree dropped to between 60 and 63 degrees and the cambium was less than 90, when the air temperature was above 105.

The tree's ability to keep its trunk cooler than the torrid surrounding air seems to be tied up with two factors. The air spaces in the wood can hold larger quantities of water vapor as the temperature rises and more spaces are developed in the finely tubular tissues of the wood. This latter occurs because of the breaking of the slender sap columns due to the severe pull exercised on them by the rapidly transpiring leaves.

From the nearby wet tissues water is evaporated rapidly into these nearly empty spaces until they are saturated with water vapor. The great amount of heat that is required to evaporate water is one of the best known physical phenomena. The tree thus keeps itself cool, at all times when it is in good foliage, by the absorption of heat from the tissues by this evaporation as if from a kind of internal sweat.

When it is remembered that the tender, growing cambium zone is not far beneath the surface of the bark, which is often heated to high temperatures by direct sunshine, the value of this cooling process is more evident.

Prof. Reynolds also points out that his studies raise anew the old question of the possible rise of water in trees in the form of vapor. This was once one of the most-discussed of plant physiological theories, but has been more or less in abeyance lately. However, if water vapor is a regular part of the tree's temperature regulating mechanism, there is at least a possibility that it is also transported upwards, to be condensed back into liquid in leaves or twigs.

Science News Letter, March 18, 1939

PATON RANCH

Situated on a mountain stream in the foothills of the Big Horn Mountains. Here a limited number of guests are cordially welcomed.

It is a region of great geological and historical interest. Marine fossils, dinosaur bones and Indian implements are found nearby.

Guest cabins are comfortable and attractive. Food is good. The use of a saddle horse is included in the weekly rate.

Write for illustrated folder with map.

WILLIAM PATON

Shell **Wyoming**

PUBLIC HEALTH

Biblical Plagues Still Weaken Egypt's Health

THE BIBLICAL plagues still afflict the land of Egypt.

Far from being a never-repeated reign of terror, the plagues with which Moses frightened a Pharaoh into releasing the Israelites were fearful because of their familiarity. And they still recur in more or less serious form, like our own epidemics and other trials.

The sequence of health hazards which the Nile brings each year was deplored recently before the World Federation of Education Associations by a physician of the government health service in Cairo, Dr. Isabel Garvice.

Pointing out the Biblical antiquity of these conditions, Dr. Garvice said that every August, then and now, the rising Nile turns blood-red from its load of heavy mud.

To drink this water is to invite sickness and death. Yet the Egyptian peasant is convinced that drinking well water would turn his hair gray and make him old before his time. Rather than risk such calamities, he clings to his year-round habit of drinking from river or canal, and the blood-red water brings the plague of boils. The children, says Dr. Garvice, often have ten to twenty boils on face and body.

As the flood waters lessen, come the plagues of frogs, flies, and death to the babies.

Even the three days of darkness which enveloped the earth in the Bible siege of plagues, is still experienced. The darkness takes the form of sandstorms, which are still terrible in upper Egypt and still last three days.

"All these things," said Dr. Garvice, "are put down to the will of God and accepted with resignation by the peasant."

But the Egyptian government is determined to cope with its plagues. Children, under compulsory schooling, are being taught health habits and given medical attention. Rural villages are shown hygiene films. Medical centers are established. The conquest of the plagues is advancing—slowly.

Science News Letter, March 18, 1939

PSYCHIATRY

Studious Laboratory Cat Breaks Down Emotionally

IT MAY seem a long step, psychologically, from a cat whimpering in a box to a young student who throws down his books and bursts into an emotional storm.

But is it?

Let us look further into the story of Tom the cat as told by Dr. Harry W. Karn, of the University of Pittsburgh, in the *Journal of Experimental Psychology*.

Tom was a willing, docile cat. Being a laboratory cat, he had lessons to learn, but he undertook them readily. The task, suited to his feline powers, was this: He must run down a center alley of a maze box, turn right around a hollow square to his starting point, repeat this maneuver a second time, and then follow a similar course to the left twice—twice right and then twice left. A reward awaited after each correct turn.

The second turn to the right was always the hardest for Tom. At one time during the early stages of his education, he fell into the way of turning right, left, left, right, and he persisted in this wrong habit for about 75 trials. Gradually he learned the correct pattern of right, right, left, left, however, and in 230 trials he built up an accuracy of 90 per cent. He was a grade B pupil.

But his teachers wanted to see whether he couldn't earn an A. So they persisted. At the second turn in the 232nd trial a radical change came over Tom. He hesitated much longer than usual at the turn and then jumped and raced around. After that he refused to enter the box. He scratched and clawed at experimenter and maze. He would not work. And he howled.

Only twice in 32 trials did he make the right turns. He went back to that old wrong pattern of right, left, left, right.

What had got into Tom? Whatever it is, psychologists would like to know, because we have seen the same thing happen to many a human Thomas. Willing, docile and reasonably successful, up to a certain point, they suddenly fly off the handle; they go back to childish ways of behaving; they strike out at those around them; or, like the cat, they cry.

Science News Letter, March 18, 1939

If You Are Interested in Better Health and Longer Life Read
TROUBLES WE DON'T TALK ABOUT
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PHYSIOLOGY

Symmetry of Human Body Is Varied in Fingerprints

MOTHER Nature in a gracious mood has provided her human sons and daughters with a pleasant symmetry. We expect right eyes to be like left eyes in color, shape, and movement. The right side of the mouth is like the left, the right ear like the left and the hands and feet like each other anatomically.

Yet every once in a while, the general pattern of symmetry breaks down in some detail. Occasionally we see a girl with a beautiful blue eye on one side of her face, but when she turns we find the second eye of an entirely different hue, perhaps hazel or even brown.

Shoe salesmen report that the two feet of the same person are likely to differ somewhat in size, so that they recommend that a purchaser try on both shoes before buying.

Study of fingerprints has revealed an interesting variation of symmetry among the fingers. In the more general anatomical features, one hand is a sort of mirror image of other. The two thumbs are alike and then each finger is like the corresponding finger of the other hand.

Not so with the fingerprints, however. In most races so far studied, the fingerprints of the thumb are more like the fingerprints of the ring finger on the same hand than they are like those of the opposing thumb, Dr. Heinrich Poll, fingerprint expert of Berlin, reports in the scientific journal, *Human Biology*. European peoples have this pattern of fingerprint symmetry and so do the Mongolian races. For certain races of Africa, however, and for the Negroes of Jamaica and Cuba, this rule breaks down. In these peoples, each digit tends to be more like the corresponding one on the other hand.

Such findings have practical implications for identification officials.

Science News Letter, March 18, 1939

Important
New Blakiston Book

Biology of the Cell Surface—JUST

This is a timely book which will appeal to all who look with interest upon the manifestation of life in animals and in man. The author presents, from a purely biological point of view, a thesis which sets a new goal for biology, the science of life. He unravels the problems of animal development, exposes them singly, defines them and relates them to the activity of the cell surface and to the general questions: What is life and how does life reveal itself?

Dr. Just, an experimental embryologist of thirty years' experience, has a peculiar talent for handling living eggs and observing vital processes. This talent together with his rare analytical mind have made him known in biological circles throughout the world. He has the exceptional ability to express abstract truth with simplicity and clearness and thus relate it to human experience. In this book he brings the reader into an arena of conflicting biological thought, expressing himself with such clearness that all can follow his argument.

CONTENTS: Introduction; Life and Experiment; Protoplasmic System; Ectoplasm; General Properties of the Ectoplasm; Water; Fertilization Process; Fertilization Reaction; Parthenogenesis; Cell-Division; Cleavage and Differentiation; Chromosomes and Ectoplasm; Ectoplasm and Evolution; Conclusion; Bibliography; Indexes.

By Ernest Everett Just

42 Illustrations (116 Figures), Tables, Bibliography. 392 Pages.

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•First Glances at New Books

Archaeology

THE WORLD'S OLDEST WRITINGS — Henry James Reynolds — *Antiquities Corp.*, 328 p., $4.95. A physician who made antiquities, especially Egyptian writings, a travel study for years writes this book telling what the world's oldest writings are and a good deal more about them. The book covers an impressive ground, but stops short of meshing in such important developments as the Ras Shamra inscriptions, China's Shang archives on bone, or the Chester-Beatty Bible discoveries.

Science News Letter, March 18, 1939

Psychology

FRUSTRATION AND AGGRESSION—John Dollard, Leonard W. Doob, Neal E. Miller, O. H. Mowrer and Robert R. Sears —*Yale University Press*, 209 p., $2. See page 168.

Science News Letter, March 18, 1939

Photography

PHOTOGRAPHY FOR FUN AND MONEY—A. Frederick Collins—*Appleton*, 391 p., $3. A prolific writer of elementary popular science books turns his hand to photography and brings to the novice much basic information seldom collected into a single volume.

Science News Letter, March 18, 1939

Ethnology

PLAINS INDIAN PAINTING—John Canfield Ewers—*Stanford Univ.*, 84 p., illus., 42 plates, $4.50. This book discusses and illustrates particularly paintings on hides, and the technique of this art; also painting on tepees, shields, and other articles. The painting of hides in other parts of America is described for comparison.

Science News Letter, March 18, 1939

Ethnology

BASIN-PLATEAU ABORIGINAL SOCIOPOLITICAL GROUPS—Julian H. Steward—*Govt. Print. Off.*, 346 p., 50 c. See page 169.

Science News Letter, March 18, 1939

Biology

A STUDY OF THE GENUS SALVADORA, THE PATCH-NOSED SNAKES—Charles M. Bogert—*Univ. of California Press*, 59 p., illus., 75 c.

Science News Letter, March 18, 1939

Agriculture

HANDBOOK OF FERTILIZERS: THEIR SOURCE, MAKE-UP, EFFECTS AND USE (3d ed.)—A. F. Gustafson — *Orange Judd*, 172 p., $1.75. Much briefer and more compact than most works on the subject, this book nevertheless gets in all the essentials and is adequate either as a supplementary text for a course in agriculture or as a working reference book.

Science News Letter, March 18, 1939

Anthropology

GYPSIES, THEIR LIFE AND THEIR CUSTOMS—Martin Block; Trans. by Barbara Kuczynski and Duncan Taylor—*Appleton-Century*, 248 p., $3.50. A really fascinating book about a people whose ways have rarely been so reasonably discussed. The author deals entirely with Europe's gypsies, explaining their emotions and their problems in language almost as vivid as his illustrations.

Science News Letter, March 18, 1939

Mathematics

PRINCIPLES OF THE THEORY OF PROBABILITY—Ernest Nagel—*Univ. of Chicago Press*, 80 p., $1.

Science News Letter, March 18, 1939

Ornithology

BICKNELL'S THRUSH, ITS TAXONOMY, DISTRIBUTION, AND LIFE HISTORY — George J. Wallace — *Boston Society of Natural History*, 401 p., $1.25. The life history of one of the rarer birds of North America, monographically treated.

Science News Letter, March 18, 1939

Technology

OXYACETYLENE WELDING (*Rev.*) — Robert J. Kehl; Rev. by Morgan H. Potter—*Amer. Tech. Soc.*, 130 p., $1.25.

Science News Letter, March 18, 1939

Documentation

FINDING LIST FOR UNITED STATES PATENT, DESIGN, TRADE-MARK, REISSUE, LABEL, PRINT, AND PLANT PATENT NUMBERS—Merle Randall and Evelyn Boelter Watson—*Univ. of Calif.*, 31 p., 35c.

Science News Letter, March 18, 1939

Economics

VERBATIM RECORD OF THE PROCEEDINGS OF THE TEMPORARY NATIONAL ECONOMIC COMMITTEE, VOL. I, December 1, 1938 to January 20, 1939—*Bur. of National Affairs, Inc.* 630 p., $5.

Science News Letter, March 18, 1939

Botany

CARNIVOROUS PLANTS AND "THE MAN-EATING TREE"—Sophia Prior—*Field Museum of Natural History*, 20 p., 25 c. A most interesting pamphlet, telling of carnivorous plants, real and imaginary, with good illustrations of both kinds.

Science News Letter, March 18, 1939

Medicine

OH, DOCTOR! MY FEET!—Dudley J. Morton—*Appleton-Century*, 116 p., illus., $1.50. With two World's Fairs in prospect for this summer, there should be plenty of readers for this book. The author, physician and professor of anatomy, uses the device of a doctor talking to his patient, nurse and fellow physicians to give information on foot troubles, their causes and what he believes should be done for them. The book is easy to read and should be helpful.

Science News Letter, March 18, 1939

Biology

ANALES DE LA ESCUELA NACIONAL DE CIENCIAS BIOLOGICAS, Vol. I, Núm. 1—*Dirección de la Escuela Nacional de Ciencias Biológicas, México, D. F., México*, quarterly, $3 per volume. A new journal, intended for the publication of results of scientific research in Mexico. Contents of this initial number range from in vitro cultivation of a Rickettsia and chromosome structure of a Drosophila species to the toxicology of scorpion venom. Format and typography are excellent, but improvement is possible in some of the photographic plates.

Science News Letter, March 18, 1939

Biography

SIR THOMAS RODDICK — H. E. MacDermot—*Macmillan*, 160 p., $2. This biography of one of Canada's great medical men is interesting not only because of the personality and accomplishments of Sir Thomas but also because of the interesting background of Canadian history.

Science News Letter, March 18, 1939

Public Health

DIETS OF FAMILIES OF EMPLOYED WAGE EARNERS AND CLERICAL WORKERS IN CITIES—Hazel K. Stiebeling and Esther F. Phipard—*Govt. Print. Off.*, 141 p., 15 c. (U. S. Dept. of Agr. Circular 507).

Science News Letter, March 18, 1939

Photography

LIFELIKE PORTRAITURE WITH YOUR CAMERA—W. H. Doering; L. A. Leigh, tr.—*American Photographic Publishing Co.*, 108 p., illus., $2. One of the few new photographic books that gives definite help. It treats portraiture as distinct from still life, and gives much information for its size.

Science News Letter, March 18, 1939